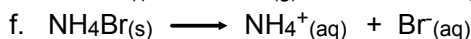
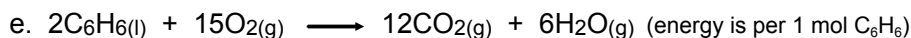
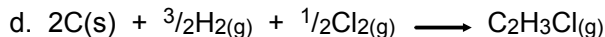
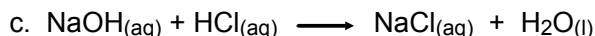
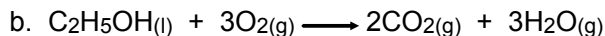
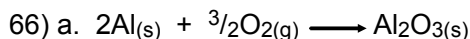
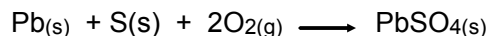
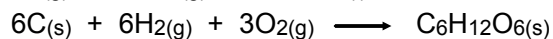
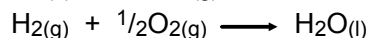
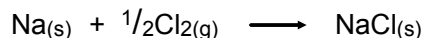


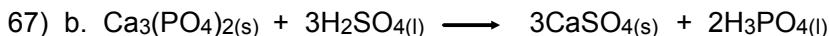
Assignment 6.4 p. 269 # 65, 66, 67, 71, 73, 74, 76, 84, 91, 92

65) The enthalpy change for the formation of one mole of a compound is the sum of the enthalpy changes of each element.



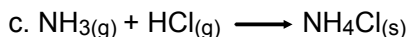
$$\Delta H^0 = 2\Delta H_f^0(\text{HCN}) + 6\Delta H_f^0(\text{H}_2\text{O}) - 2\Delta H_f^0(\text{NH}_3) - 2\Delta H_f^0(\text{CH}_4)$$

$$\Delta H^0 = 2(135.1) + 6(-242) - 2(-46) - 2(-75) = -940. \text{ kJ}$$



$$\Delta H^0 = 3\Delta H_f^0(\text{CaSO}_4) + 2\Delta H_f^0(\text{H}_3\text{PO}_4) - \Delta H_f^0(\text{Ca}_3(\text{PO}_4)_2) - 3\Delta H_f^0(\text{H}_2\text{SO}_4)$$

$$\Delta H^0 = 3(-1433) + 2(-1267) - (-4126) - 3(-814) = -265 \text{ kJ}$$



$$\Delta H^0 = \Delta H_f^0(\text{NH}_4\text{Cl}) - \Delta H_f^0(\text{NH}_3) - \Delta H_f^0(\text{HCl})$$

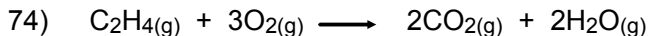
$$\Delta H^0 = (-314) - (-46) - (-92) = -176 \text{ kJ}$$

71) $(-1676) + (-704) + 3(90) + 6(-242) - 3(-295) = -2677 \text{ kJ}$

73) $6(-271) - 2(X) - 2(-46) = -1196 \text{ kJ}$

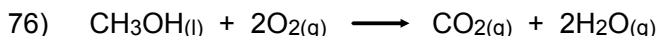
$$-2X = 338 \text{ kJ}$$

$$X = -169 \text{ kJ/mol}$$



$$2(-393.5) + 2(-285.8) - \Delta H_f^0(\text{C}_2\text{H}_4) = -1411.1$$

$$\Delta H_f^0(\text{C}_2\text{H}_4) = 52.5 \text{ kJ/mol}$$



$$\Delta H^0 = (-393.5) + 2(-285.8) - (-239)$$

$$\Delta H^0 = \frac{-726.1 \text{ kJ}}{1 \text{ mol}} \bigg| \frac{1 \text{ mol CH}_3\text{OH}}{32.042 \text{ g}} = 22.7 \text{ kJ/g}$$

$$84) \quad \Delta H^0 = 2\Delta H_f^0(\text{KOH}) - 2\Delta H_f^0(\text{H}_2\text{O})$$

$$\Delta H^0 = 2(-481) - 2(-286) = -390. \text{ kJ}$$

$$\frac{5.00 \text{ g K} \mid 1 \text{ mol K} \mid -390. \text{ kJ}}{39.10 \text{ g K} \mid 2 \text{ mol K}} = -24.9 \text{ kJ}$$

$$24,900 \text{ J} = 1,000. \text{ g } \Delta T (4.18 \text{ J/g}^\circ\text{C})$$

$$\Delta T = 5.96^\circ\text{C} \quad T_f = 24.0^\circ\text{C} + 5.96^\circ\text{C} = \mathbf{30.0^\circ\text{C}}$$

$$91) \quad \Delta H^0 = 3\Delta H_f^0(\text{C}_2\text{H}_2) - \Delta H_f^0(\text{C}_6\text{H}_6)$$

$$\Delta H^0 = 3(227) - (49) = 632 \text{ kJ}$$

C₂H₂ is lighter and has a higher heat of formation, so it would produce a lot more energy per gram than C₆H₆.

